trachea and muscles. Its affinity to Scansores is also, I think, explained by the great facility with which it scrambles or climbs over rocks and stumps*.

I have considered Scansores as distinct from Insessores throughout this paper; and think that ornithologists will, until more is known of the anatomy of birds than at present, find it convenient to class Birds in the following Orders, which may be distinguished in general by their skeletons:—RAPTORES, VOLITORES (containing the Fissirostral groups), SCANSORES, INSESSORES, RASORES, CURSORES, GRALLATORES and NATATORES. Perhaps the Pigeons also with advantage may be divided from the other RASORES.

BIBLIOGRAPHICAL NOTICES.

An Introduction to the modern Classification of Insects, founded on the Natural Habits and Corresponding Organization of the different Families. By J. O. Westwood, F.L.S., &c. 2 vols. 8vo, with Figures. London: Longman and Co.

No branch of natural science has made such extraordinary and rapid strides within the last few years in this country as the study of insects. The contrast which it exhibits at the present day, compared with its state thirty years ago, is most striking. *Then,* at the period when we commenced our entomological career, the literature of the science was most meagre and marrowless; we had, it is true, for our guides Stewart's 'Elements,' Marsham's 'Coleoptera,' Haworth's 'Lepidoptera,' and the picture-books of Doudran, estimable works enough in their way, but from which the inquirer who wished to obtain more than a knowledge of the mere name of his species would not derive a particle of philosophy. The minute investigations of the anatomist, the principles of natural classification founded upon the various relations of the different tribes and the variations in the metamorphoses of all insects, save the Lepidoptera, were subjects scarcely dreamt of; and, in truth, the entomologist merited no other name than that of a collector, his only aim being the getting together of as great a number of species as possible, and storing them up in his cabinets.

The appearance of the first two volumes of the 'Introduction' of Messrs. Kirby and Spence placed the science on a far different footing, showing the inquirer, in a most engaging manner, that it possessed far higher claims to his attention. In these delightful volumes the natural history and œconomy of the insect tribes were proved to be as interesting and worthy of observation as those of the highest animals. The subsequent appearance of the third and fourth volumes of the same work opened the wide field of insect anatomy and the principles of entomological classification; thus forming, with the preceding volumes, the most complete general 'Introduction' to the study hitherto published. These were shortly followed by the appearance of Mr. Curtis's beautiful work on the 'Genera of British Insects,' recently noticed in our pages, and by the 'Systematic Catalogue and Illustrations' of Mr. Stephens, the latter consisting of detailed descriptions of all the British species.

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* See Collins's Account of New South Wales.

Besides these, a very considerable number of minor treatises have been produced by authors who have in a great measure been instigated to the pursuit by the establishment of the various entomological societies, and whose works are scattered through the pages of numberless English and Foreign Transactions and other similar works. During this period also the principles of natural classification have been greatly investigated both at home and abroad, but in no work have these principles being applied throughout to the numerous families of insects.

The object of the present work may be best shown by the following passages from the preface to the first volume. After noticing the distinction between the *general* nature of Introductions to Entomology and the *generic* and *specific* nature of the works of Curtis, Stephens, etc., the author observes that the student has hitherto been "led at once from the *general views* he had gained on the subject to the minute technical details of *genera* and *species*, there being no work which he could take up to serve as a guide to the development of the principles of modern classification in the distribution of the *orders* and *families*. For years this deficiency has strikingly manifested itself to me, and it is long since I announced my present undertaking, in which I had proposed to myself to show the application of the modern views which have been entertained relative to the natural relations of animals in the arrangement of the entire groups of winged insects; illustrating the subject by details of the natural habits, transformations, and structure of the different families."

The work opens with a series of general observations upon the class of Insects, their general structure and transformations, and the various systems of Swammerdam, Linnæus, Fabricius, Latreille and MacLeay, the respective authors of the metamorphotic, alary, cibarian, eclectic, and representative systems. The arrangement adopted by the author nearly corresponds with that of MacLeay, the orders of Hexapod, Metamorphotic Insects (which are alone treated upon in this work), being divided into two parallel sub-classes. Each order with its sections is then passed in review, ample details being given of the characters, structures, habits, transformations, and general distribution and relation of the different families, with an illustration of their characteristic anatomical details and preparatory states. It is thus that the author has endeavoured to make his work a fitting 'Sequel' to the 'Introduction' of Kirby and Spence, whilst at the same time it will be found equally, if not still more, useful to the student who would extend his inquiries beyond the details of genera and species: in this respect it forms an equally fitting precursor to the works of Curtis, Stephens, etc. A few extracts, however, will more satisfactorily show the manner in which the author has treated the subject in its various bearings; we will therefore take the distribution of the Coleoptera, which has lately been the subject of much discussion, as an example of the manner in which the *natural classification* of insects is treated. After reviewing the arrangements of Linnæus, Latreille, MacLeay, etc. (that of the last-named author being founded upon the analogical relations of the preparatory states and the asserted inaccuracy of the tarsal system), the author observes, in addition to our ignorance of the larvæ of many important groups, " that Mr. MacLeay himself admits the existence of a variation in the tarsal structure concurrent with the variation in the form of the larvæ, a circumstance dependent, as it seems to me, upon the principle that modifications of the preparatory states of an insect ought merely to be regarded as indications of corresponding peculiarities in the final state, the former modifications being subordinate to those observed in the imago, and having, in fact, been undergone with a direct view to the perfection of the insect. We might indeed carry the subject still further. Thus, whilst the intimate connexion existing throughout the whole of the Tetramerous Beetles cannot be denied, yet Cerambyx has a subvermiform and Chrysomela an anopluriform larva; whilst the latter and Coccinella (Mr. MacLeay's two examples of the Anopluriform Stirps), although agreeing in the larvæ, are totally different in the habits and in the structure of the tarsi of the imago." After some further observations, he adds, that " The Coleoptera are therefore divisible into the four following sections: 1. Pentamera, in which all the tarsi are 5-jointed, the fourth being of ordinary size; 2. Heteromera, in which the four anterior tarsi are 5-jointed, and the two posterior 4-jointed; 3. Pseudotetramera (or Subpentamera, Tetramera, Latreille, Cryptopentamera, Burm.), in which the tarsi are 5-jointed, but the fourth joint is exceedingly diminutive, and concealed between the lobes of the preceding; 4. Pseudotrimera (or Subtetramera, Tetramera, Latr., Cryptotetramera, Burm.), in which the tarsi are 4-jointed, the third joint being very diminutive, and concealed between the lobes of the preceding."

As a specimen of the *structural details*, the following account of the structure of the mouth of the preparatory states of the May-fly (*Ephemera vulgata*) may be quoted :—" Considering the rudimental nature of the mouth of the imago, it is surprising that no one has hitherto described the real structure of the mouth in the preparatory states. Reaumur has attempted it, but his figures are so rude and insufficient, that no idea can be gleaned as to their true structure; Swammerdam also passes them over undescribed. In the pupa of *E. vulgata* the upper lip is of moderate size, with the anterior angles rounded off and ciliated; it is flat and quite membranous: the mandibles are horny, armed with several teeth within, near the base, which is dilated into a flattened molary plate, whilst the upper angle of the mandible is produced into a long curved horn. The maxillæ are small, membranous, curved, pointed at the tip and internally setose: the maxillary palpi do not extend beyond the front of the head;

they are 4-jointed, the basal joint being very short: the lower lip is very large and membranous, covering the under side of the mouth; it is quadrilobed and furnished within with a broad tongue, of which the anterior angles are produced and pilose; the labial palpi are broad and 3-jointed."

The account of the proceedings of the Ant-lion may be taken as an example of the manner in which the *natural history* of the various families is treated :—

" It is in very fine sand that the larva makes its pitfall. When placed upon the surface, it bends down the extremity of the body, and then pushing, or rather dragging, itself backwards by the assistance of its hind legs, but more particularly of the deflexed extremity of its body, it gradually insinuates itself into and beneath the sand, constantly throwing off the particles which fall upon, or which it shovels, with its jaws or legs upon its head, by suddenly jerking them backwards,

'Ossaque post tergum magnæ jactata parentis.'

" Proceeding in this manner, in a spiral direction, it gradually diminishes the diameter of its path, and by degrees throws so much of the sand away, as to form a conical pit, at the bottom of which it then conceals itself, its mandibles, widely extended, being the only parts that appear above the surface; with these, any luckless insect that may happen to fall down the hole is immediately seized and killed. When the fluids of the victim are exhausted, the Ant-lion, by a sudden jerk, throws the dry carcass out of the hole; should, however, the insect by chance escape the murderous jaws of its enemy, the latter immediately commences throwing up the sand, whereby not only is the hole made deeper and its sides steeper, but the escaping insect is probably hit, and again brought down to the bottom of the pit. It is chiefly upon ants and other soft-bodied insects that these larvæ feed. They are, however, capable of undergoing long fasts, for one of my larvæ remained from October till March without food. It has been supposed that, as the food of these larvæ consists entirely of juices, and as they appear to be destitute of anal aperture, the whole of their food is assimilated. M. L. Dufour has, however, traced the intestinal canal terminating in an anus, which is, indeed, very difficult to discover. (Ann. Soc. Ent. de France, tom. ii. p. 67. App.) Latreille states that these larvæ are produced in the summer or autumn, and become pupæ in the following spring. I found the larvæ of all sizes in July, one of which became a pupa, and assumed the perfect state; whilst another, of equal size, remained through the winter in the larva state. Previous to assuming the pupa state, the larva forms a globular cocoon of less than half an inch in diameter of fine sand, glued with silken threads spun from a slender telescopic-like spinneret placed at the extremity of its body, and lined with fine silk. The pupa is small, not being half an inch long, inactive, and with all its limbs laid at rest upon the breast. When ready to assume the perfect state it uses its mandibles, which are quite unlike those of the larva and imago, and which have not been before described, to gnaw a hole through the cocoon, and pushes itself partly through the aperture, in which it leaves the pupa skin."

The work is illustrated with a coloured plate, containing examples of most of the orders, and by nearly 2500 figures representing the types of the different families, with their preparatory states and structural peculiarities, there being not fewer than 340 figures of perfect insects, and more than 420 of larvæ and pupæ. Another important feature in the work, and one which we can well believe must have cost the author very great labour, is the bibliographical references to each of the families. These cannot fail to be of infinite service to the student, as they contain notices of every paper or detached memoir of the least value published on the subject up to the date of the work. At the same time, in order to render it still more useful, a complete synopsis of the British genera, brought down to the present time, is added, and in which are included the characters, synonyms, and authorities of the genera, the number of British species, and name of the type, with a reference to a figure of the genus. Having thus given our readers an insight into the comprehensive nature of the work before us, we must observe, that the discussion of the relations of the different families, and of the views entertained thereof by preceding writers, appears too much detailed. The great extent of the subject, however, and the comparatively slight grounds existing towards a perfect classification of the very numerous tribes of insects, have necessarily involved many of their relations in doubt, and of which the discussion cannot fail to be productive of advantage. We also notice a few typographical errors, some of which, however, are corrected in the Appendix. In conclusion, as this work has the rare merit of interfering with no other hitherto published, we cordially recommend it as one rendered necessary by the progress of the science, and as the result of the most laborious research, and consequently as deserving, both from its nature and execution, of becoming a standard work of reference in every zoological library.

Otia Hispanica. Auctore P. B. Webb. Pentas 2, 1839.

The present number of this valuable work, which has only recently reached us, is occupied by figures and descriptions of five species of Algæ, by C. Montague, M.D., and as they are all either new or but little known, we cannot do better than transcribe their specific characters; we must, however, previously state that each of the species is fully illustrated by magnified dissections, and by a detailed description and copious observations.

1. *Griffithsia flabellata* (Montag.), filis setaceis virgatis, ramis alternis pinnatis, pinnis tandem divaricato-recurvis, pinnulis subsecundis erectis, articulis diametro quintuplo-duplo longioribus, capsulis maximis involucratis.—Ceramium et Callithamnion flexuosum, *Agardh*.

Agardh appears never to have seen the fruit of this plant, and therefore referred it to *Callithamnion*, to which genus it is closely allied in general appearance. Its fruit is that of a *Griffithsia.*

2. *Griffithsia Schousboei* (Montag.), repens, intricata, filis dichotomis articulato-constrictis, articulis elliptico-sphæricis e geniculis radicellas hyalinas emittentibus.

"The absence of fructification causes me to doubt if this is not an abnormal state or a rampant variety of *G. corallina* (Ag.)."

3. *Gigartina conferta* (Schousb.), fronde cartilaginea, filiformi, vage ramosa, ramis fasciculatis confertis, ramulos abbreviatos patentes apice incrassato-ovoideos undique emittentibus.

4. *Gigartina gaditana* (Montag.), fronde cartilaginea, filiformi, dichotoma, aculeis simplicibus brevissimis subsecundis utrinque attenuatis obsita.

Probably closely allied to the *Sphærococcus armatus* (Agardh).

5. *Delesseria interrupta* (Ag.), fronde membranacea tenerrima, interrupte costata, lineari, dichotoma, apice furcata rotundataque.

This second number fully supports the high character which had been obtained by its predecessor, and we trust that the work will receive that support which it deserves from the botanists of Britain.

PROCEEDINGS OF LEARNED SOCIETIES.

ZOOLOGICAL SOCIETY.

June 23, 1840.—William Yarrell, Esq., V.P., in the Chair.

The Rev. F. W. Hope read a paper entitled "Observations on the *Stenochoridæ* of New Holland, with descriptions of new species."

Of this paper the following is an extract:—

Fam. STENOCHORIDÆ, Leach.

Type of the family *Stenochorus semipunctatus*, Fab.

Section 1. *Armigeri.*

Antennis thoraceque spinosis, apicibus elytrorum bidentatis.

Sp. 1. STENOCHORUS GIGAS. *Sten. ater thorace spinoso inæquali, elytris basi nigro flavoque variegatis.*

Antennæ corpore fere duplo longiores, articulis ternis primis nigricantibus, reliquis fusco-ferrugineis, articulis intermediis apice spinosis. Caput atrum antice rufo-ciliatum palpis ferrugineis. Thorax utrinque spinosus spinis brevibus, tuberculatus, rugosus et ater. Elytra bidentata, basi nigro flavoque variegata, varioloso-punctata. Corpus infra nigrum abdomine postice piceo, femoribus atris, tibiis tarsisque fusco-brunneis et tomentosis.

Long. lin. $18\frac{1}{2}$; lat. lin. $5\frac{1}{2}$.

Hab. In interiori parte Novæ Hollandiæ.

This magnificent species, the largest of the genus, was given to Captain Roe, when engaged on his survey of the Australian coast; it was labelled as coming from the inner country.

In Museo Dom. Hope.

Sp. 2. STENOCHORUS LATUS. *Sten. fusco-brunneus, thorace cinereo-*